

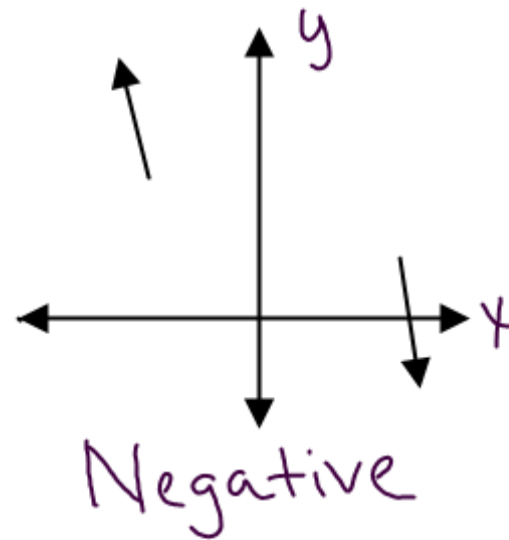
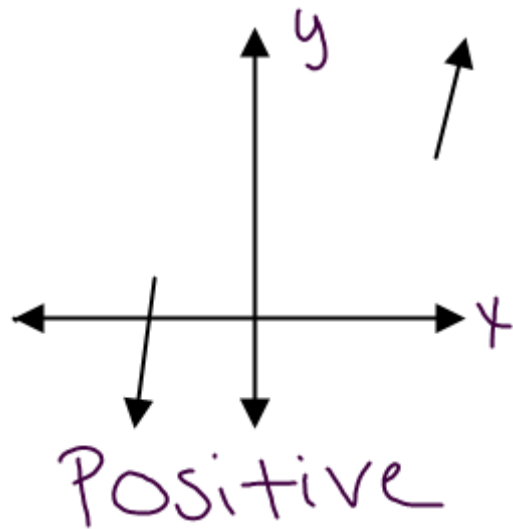
# Polynomial Functions

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x + a_0.$$

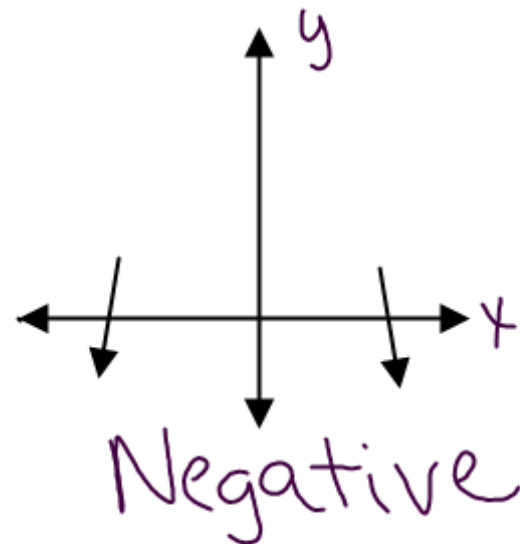
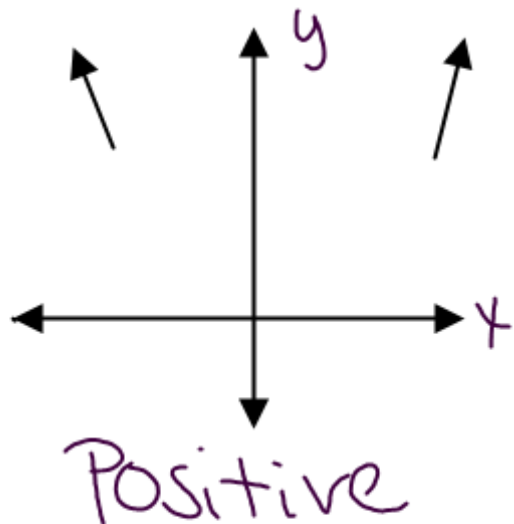
Smooth, continuous

- 1.)  $x=a$  is a zero of the function  $f$ .
- 2.)  $x=a$  is a solution of the polynomial equation  $f(x)=0$ .
- 3.)  $(x-a)$  is factor of the polynomial  $f(x)$ .
- 4.)  $(a,0)$  is an  $x$ -intercept of the graph of  $f$ .

When  $n$  is odd:



When  $n$  is even:



## Multiplicity

$$3(x-1)^2(x+1)^3$$

## Other Key Points

- Polynomial function of degree  $n$ :
  - 1.) has at most  $n$  zeros
  - 2.) has at most  $n-1$  extrema
- Intermediate Value Theorem

NO CALCULATORS - sketch an accurate graph  
of the following functions:

Ⓐ  $f(x) = \frac{1}{3}(x+1)(x-2)^2$

Ⓑ  $f(x) = (x+2)(x)^3$

Ⓒ  $f(x) = -\frac{1}{4}(x)^2(x+\sqrt{12})(x-\sqrt{12})$

Ⓓ  $f(x) = \frac{1}{5}x(x-1)(x-3)(x+1)(x+3)$

## Section 2.2

#1-6(vocab), 1-8(no calc), 9-12(no calc),

17-24, 28, 32, 35, 38, 45, 49, 53-60,

61-72, 83 (sketch like 61-72)